REMARKS

Claims1-10, 15 and 17-19, and 21-23 are pending in the present application, claim 20 having been cancelled and claim 23 having been added herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Claims 1-6, 8-10 and 21-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ellis et al. (US Patent No. 4,349,498) in view of McCrory et al. (US Patent No. 6,333,971). Withdrawal of this rejection is respectfully requested.

In order to overcome the objections of the Examiner, claim 1 is amended by specifying that the marker element is fixed to a free end of the implant in a detachable manner when this implant is fixed in the bone of the jaw.

The Examiner asserts that Ellis et al. teaches a method to determine the position of a dental implant which is fixed in the bone of the jaw. However, as already explained in the reply of August 17, 2010 to the Office Action of February 17, 2010, Ellis is only disclosing that the position of the root portion of the implant is monitored. Indeed, a marker encased in a root portion of the implant only allows detection of the presence of the implant and verification of whether during and after implantation a sufficient distance is maintained between the root portion of the implant and the mandibular nerve. In this manner it is avoided that the implant pierces into the mandibular nerve during implantation. For this reason the wording "monitoring" is used by Ellis.

The simple presence of a marker that is encased in the dental implant, does not allow determination of the position of the implant with sufficient accuracy. Due

to the distance (d) that is maintained between the free end of the implant and the marker element in the method according to the invention, the exact position of the implant can be determined.

Thus, Ellis does not disclose or suggest calculating or determining the exact position of the dental implant and only indicates that the root portion of this implant may be monitored.

Further, Ellis does not teach how to determine the position of a dental implant that does not have a radiographic marker element fully encased therein. The method of the present invention is in particular suited and intended to determine the position of such a dental implant.

According to the Examiner, it would have been obvious to one having ordinary skill in the art to modify means of attachment taught by Ellis with the detachable means taught by Mc Crory et al. as a matter of obvious design choice. In this respect the Examiner asserts that McCrory teaches a permanent attachment and a detachable attachment of the marker element.

However, the Applicant strongly disagrees with this interpretation of McCrory. It is correct that McCrory discloses a marker element that can be fixed to a base in a detachable manner, but McCrory does not teach a permanent attachment of the marker element to a base or some kind of implant.

McCrory only teaches that the marker element itself can be permanent, meaning that the marker element can be fixed directly to the person by implantation. Indeed, in column 3, lines 52-53, and column 6, lines 17-35, of McCrory an implantable

marker is described. It is clear that this implantable marker is directly accommodated into the bone and that it is not somehow attached to an implant.

Since McCrory does not teach a marker element that is permanently fixed to a base or an implant, the reasoning of the Examiner based on this assumption is not correct. Consequently, there is no basis to argue that that it would have been obvious to one having ordinary skill in the art to modify means of attachment taught by Ellis with the detachable means taught by Mc Crory et al. as a matter of obvious design choice.

Indeed, none of the prior art documents, or even a combination of those documents, would have made it obvious for one having ordinary skill in the art to attach in a detachable manner a separate marker element to a dental implant in order to determine the position and orientation of the implant.

McCroy is only observing the position of the markers themselves and does not determine the position of the corresponding base. In McCroy the position of the base that is affixed to the bone, is of absolutely of no relevance.

Thus there is no reason why one having ordinary skill in the art would combine the teaching of Elli and McCrory.

Even if one having ordinary skill in the art would combine Elli with McCrory and modify the dental implant of Elli by detachably attaching the marker element of McCrory, then this combination still does not teach or suggest to identify the exact position of the implant itself from the observed position of the marker element.

Neither is it obvious from the combination of Elli and McCrory to determine the position and the orientation of the implant by defining a straight line trough a centre point of the marker element according to the method of claim 4.

Contrary to the assertions in the Office Action, McCrory does not teach that the position and the orientation of the implant is determined by defining a straight line trough the centre point of the marker element that is parallel to the longitudinal side of the image of the support. As already mentioned above, McCroy is only observing the position of the markers themselves and the position of the corresponding base that is affixed to the bone, is of absolutely of no relevance.

As to claims 5 and 6, the Examiner correctly stating that Ellis/McCrory does not teach the method comprising the step of determining the orientation and position of the central axis of the implant by defining the centre of gravity of pixels representing the implant or the support in the image, as well as the centre of gravity of the image of the marker element. However, the further assertion this would have been an obvious modification to one having ordinary skill in the art by using any known mathematical method, is purely based on impermissible hindsight and on the disclosure of the Applicant. Indeed, none of the prior art teaches or suggests attaching, in a detachable manner, a separate marker element to a dental implant in order to determine the position and orientation of the implant itself.

Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ellis et al. in view of McCrory as applied in claim 1 and further in view of Hattori (U.S. Patent No. 5,989,258). Withdrawal of this rejection is respectfully requested.

The Applicant strongly disagrees with the assertions made in the Action, and repeats that Hattori does disclose a surgical stent (35) having multiple markers (57). However, the stent and the markers are not fixed to the implant and are only used for determining the positions and directions of drilling operation (see column 7, lines 11-38) before introduction of the implant into the jawbone. It should be clear that it makes no sense, and that it is not possible, to determine the angular position of the implant in relation to its longitudinal axis before the implant is introduced into the jawbone.

Contrary to the assertions in the Action, the multiple markers of Hattori are in no way fixed to the dental implant. Instead, in Hattori, the surgical stent with said multiple markers, is removed before the implants are introduced in the jawbone such that the markers of the stent do not allow to determine the angular position of the implants in relation to their central axis. Thus it is not possible with Hattori to determine the angular position of an implant after it has been introduced into the jawbone.

Claims 15 and 17-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sala Meseguer (U.S. Patent No. 6,093,023). Withdrawal of this objection is respectfully requested.

In view of the objections of the Examiner, claim 15 has been amended by specifying that the second marker element of the sleeve has a centre point that is not situated on the central axis of the sleeve. This amendment is based on the features of claim 7 and on the disclosure of the specification of the application.

Since the center point of the protrusions on the side of the sleeve of Sala is situated on the central axis of the sleeve, the added feature of amended claim 15 is not disclosed by Sala.

Further, claim 15 has been amended by adding the feature of claim 20 that the support is mainly formed of a material which is transparent to X-rays.

The Examiner asserts that the notch (36) on top of the screw (35) of Scala constitutes a marker element. However, even if the screw (35) would be formed of a material that is transparent to x-rays, the notch would not produce a strong contrast in an image generated by X-rays or magnetic resonance compared to the implant itself. Such a notch is, by definition, an air filled gap and such a gap does not generate an image with a strong contrast.

Modifying the notch (36) such that it would produce a strong contrast in an image generated by X-rays or magnetic resonance compared to the implant itself, would require filling this notch with a material that produces a strong contrast in an image generated by X-rays or magnetic resonance. Such a modification would not have been obvious for one of ordinary skill in the art since it alters the intended purpose of this notch. The purpose of this notch (36) is to rotate the screw by means of a screwdriver. Accordingly, filling this notch with a material that produces a strong contrast in an image generated by X-rays or magnetic resonance compared to the implant itself would be entirely based on the teaching of the disclosure of the Applicant.

In view of the above amendment and remarks, Applicant respectfully requests reconsideration withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to the effect is most earnestly solicited.

If the Examiner has any questions, he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

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